

Amendment and Response

Applicant: Ramiro N. Castellanos et al.

Serial No.: 10/035,592

Filed: October 23, 2001

Docket No.: A126.169.101

Title: SYSTEM AND METHOD FOR INSPECTION USING OFF-ANGLE LIGHTING

REMARKS

These remarks are made in response to the Non-Final Office Action mailed July 1, 2005.

In that Office Action, the Examiner rejected claims 1-8, 11, and 25 under 35 U.S.C. §103(a) as being unpatentable over Nishimura et al., U.S. Patent No. 5,761,337 (“Nishimura”) in view of Bushroe, U.S. Patent No. 5,164,994 (“Bushroe”). Claim 21 was rejected under 35 U.S.C. §103(a) as being unpatentable over Nishimura in view of Nichani, U.S. Patent No. 6,259,827 (“Nichani”). The Examiner’s indications that claims 9, 10, and 12-20 have been allowed and that claims 22-24 would be allowable if rewritten in independent form are noted with appreciation.

With this Response, claims 1, 11, 21, and 25 have been amended. Claims 1-25 are pending in the application and are presented for consideration and allowance.

Specification Support for Amendments of Claims 1, 21, and 25

Support for the amendment of claim 1 can be found, for example, at page 11, lines 11-29.

Support for the amendment of claim 21 can be found, for example, at page 29, lines 7-10.

Support for the amendment of claim 25 can be found, for example, at page 28, lines 24-31 to page 29, lines 1-8.

35 U.S.C. §103 Rejections

Claims 1-8 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Nishimura in view of Bushroe. Independent claim 1 relates, in part, to an image analysis system receiving image data of a component and analyzing the image data utilizing gradient processing to locate one or more features. For at least the reasons described below, the cited references fail to teach or suggest such limitations.

At page 4 of the Office Action, it is acceded that “Nishimura is silent about an image analysis system receiving image data of the component and analyzing the image data utilizing gradient processing to locate one or more features.” *NFOA* at pg. 4. Instead, the combination of Bushroe with Nishimura is cited as providing such limitations. However, Bushroe does not teach or suggest comparing a first gradient value to a second gradient value as required by the

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limitations of independent claim 1 as amended. In particular, Bushroe discloses comparing a pixel to a threshold (e.g., col. 4, ll. 40-43), comparing an average intensity of a group of pixels in a sub-window to a threshold (e.g., col. 4, ll. 61-64; col. 6, ll. 29-35), or comparing a pixel to an intensity band (a range of intensities as used in Bushroe) (e.g., col. 6, ll. 63-68 to col. 7, ll. 1-6). As such, Bushroe merely teaches determining whether a pixel value is greater than or lower than a threshold, or outside of an intensity band of pixel values. Thus, Bushroe fails to teach or suggest actually using any gradient value, much less comparing a first gradient value to a second gradient value.

In light of this clarification, none of the cited references teach or suggest the limitations of independent claim 1 as amended. Therefore, the rejection of independent claim 1 is respectfully traversed. Furthermore, as claims 2-7 depend, in some form, from independent claim 1, they are believed to present patentably distinct material from the cited references for reasons similar to those described above. As such, their rejection is also respectfully traversed. In sum, allowance of independent claim 1 and dependent claims 2-7 is requested with allowance and notice to that effect.

Independent claim 11 stands rejected under 35 U.S.C. §103. Claim 11 has been amended to depend from independent claim 9, which has been deemed allowable by the Examiner. *NFOA* at pg. 2, para. 4. As such, it is believed that claim 11 is also allowable. Notice to that effect is respectfully requested.

Independent claim 21 stands rejected under 35 U.S.C. §103 as being unpatentable over Nishimura in view of Nichani. Independent claim 21 as amended relates, in part, to an axial lighting system illuminating a component, an off-axis lighting system illuminating the component, and a dual lighting analysis system analyzing image data of the component created when the axial lighting system and the off-axis lighting system are simultaneously illuminating the component and generating component acceptance data. For at least the reasons described below, the cited references fail to teach or suggest such limitations.

The Examiner indicated that Nichani and Nishimura provided the limitations of independent claim 21 prior to amendment, including limitations relating, in part, to an axial lighting system and an off-axis lighting system both illuminating a component. *NFOA* at pg. 8.

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The Examiner also provided the guidance that the claim language of independent claim 21 prior to amendment was given its broadest reasonable interpretation. *Id.* In light of the Examiner's remarks, independent claim 21 has been amended such claim 21 includes limitations relating, in part, to an axial lighting system and an off-axis lighting system simultaneously illuminating a component. As noted by the Examiner, Nishimura is silent in this respect. Nichani also fails to teach or suggest such limitations, and in fact, teaches away from the limitations of independent claim 21 as amended. As previously argued, Nichani specifically states “[T]he method requires an image of the semi-conductor die with lighting source 24 or other grazing light.... [T]he method requires an image of the semi-conductor die with an on-axis light source 22 these images can be acquired at any times [sic] – though not concurrently – they are typically acquired at about the same time.” *Nichani* at col. 6, ll. 36-44 (emphasis added). Thus, Nichani mandates non-concurrent, non-simultaneous lighting with lighting source 24 and on-axis light source 22. *Nichani* at col. 5, ll. 51-56. As such, Nichani teaches away from the limitations of independent claim 21 as amended. In light of the Examiner's remarks and the above clarification, the rejection of independent claim 21 is respectfully traversed. As such, withdrawal of that rejection, allowance of independent claim 21 as amended, and notice to that effect are requested.

While the Examiner's indication that dependent claims 22-24 would be allowable if rewritten in independent form is noted with appreciation, it is believed that independent claim 21 as amended presents patentably distinct material from the cited references. In particular, claims 22-24 depend from claim 21, and as such, should be deemed allowable in their present form. Accordingly, notice to that effect is respectfully requested.

Independent claim 25 stands rejected under 35 U.S.C. §103 as being unpatentable over Nishimura in view of Bushroe. Independent claim 25 as amended relates, in part, to a band analysis system receiving image data of a component and analyzing the image data to identify two or more edges to determine whether a band between the two or more edges identifies the one or more features. For at least the reasons described below, it is believed that the cited references fail to teach or suggest such limitations.

In particular, as previously identified, Bushroe relates to comparison of pixel intensity to a band, or range, of light intensities. *Bushroe* at col. 6, ll. 63-68 to col. 7, ll. 1-6. In this manner,

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Bushroe addresses a method in which pixels can be compared to the band of light intensities to determine whether or not a sub-window N is part of a solder joint or not part of a solder joint.

E.g., Bushroe at col. 6, ll. 10-42; col. 6, ll. 63-68 to col. 7, ll. 1-6. However, this does not teach or suggest identifying two or more edges to determine whether a band between the two or more edges identifies one or more features as required by the limitations of claim 25 as amended. As such, it is believed that the rejection of independent claim 25 as amended is traversed. With this clarification in mind, allowance and notice to that effect are respectfully requested.

In sum, and in light of the above, the bases of rejection identified in the Office Action have been overcome such that the rejection of claims 1-8, 11, 21, and 25 are fully traversed. As such, withdrawal of the rejection of those claims with allowance and notice to that effect are respectfully requested.

CONCLUSION

In view of the above, Applicant respectfully submits that pending claims 1-25 are in form for allowance and are not taught or suggested by the cited references. Therefore, reconsideration and withdrawal of all rejections and allowance of claims 1-25 are respectfully requested.

No fees are required under 37 C.F.R. 1.16(b)(c). However, if such fees are required, the Patent Office is hereby authorized to charge Deposit Account No. 50-0471.

The Examiner is invited to contact the Applicant's representative at the below-listed telephone numbers to facilitate prosecution of this application.

Any inquiry regarding this Amendment and Response should be directed to Timothy A. Czaja at Telephone No. (612) 573-2004, Facsimile No. (612) 573-2005. In addition, all correspondence should continue to be directed to the following address:

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Respectfully submitted,

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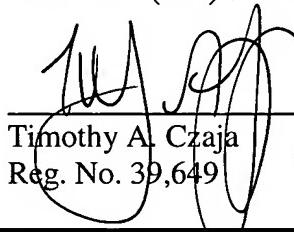
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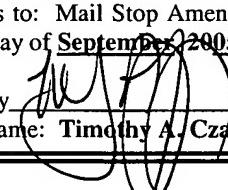
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CERTIFICATE UNDER 37 C.F.R. 1.8:

The undersigned hereby certifies that this paper or papers, as described herein, are being deposited in the United States Postal Service, as first class mail, in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 30 day of September, 2005.



By _____
Name: Timothy A. Czaja